

Notice of Allowability

Application No.

09/928,402

Examiner

Juan A. Torres

Applicant(s)

FREIDHOF ET AL.

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/14/2005.
2. ☒ The allowed claim(s) is/are 1-18.
3. ☒ The drawings filed on 14 January 2005 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 05-02-05.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Martin Geissler on 05/09/2005 at 10:30 am.

The application has been amended as follows:

a) In lines 7-9 of claim 1 the recitation "length N/B which is a predetermined fraction $1/B$ of an observation length of N phase values ($C_{a1}(i)$), to create added-up phase values ($S_{a1}(i)$)" is changed to "length N/B , which is a predetermined fraction $1/B$ of an observation length of N phase values ($C_{a1}(i)$), to create added-up phase values ($S_{a1}(i)$), where B is a positive integer".

b) In line 11 of claim 10 the recitation "phase values ($C_{a1}(i)$)," is changed to "phase values ($C_{a1}(i)$), where B is a positive integer".

EXAMINER'S STATEMENT FOR REASONS FOR ALLOWANCE

Claims 1-18 are allowable over prior art.

The following is an examiner's statement of reasons for allowance: claim 1-18 are allowed because the references cited fail to teach, as applicant has, a method for estimating one of the frequency (f_{a1}) and the phase (ϕ_{a1}) of a digital input signal ($x(i)$) having the process steps of: determining phase values ($C_{a1}(i)$) of the digital input signal ($x(i)$), summing the phase values ($C_{a1}(i)$) over a predetermined summation length N/B

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which is a predetermined fraction $1/B$ of an observation length of N phase values ($C_{a1}(i)$), to create added-up phase values ($S_{a1}(i)$), reducing a sampling rate of the added-up phase values ($C_{a1}(i)$) by the factor N/B in comparison with a sampling rate (f_{a2}) of the phase values ($C_{a1}(i)$), delaying the added-up phase values ($S_{a1}(i)$) with at least $B-1$ delay elements, each of which delays the added-up phase values ($C_{a1}(i)$) by one sampling period of the reduced sampling rate ($f_{a2} \cdot B/N$), adding up the delayed added-up phase values ($S_{a1}(i)$) to create a resulting pulse response (h_f) of the frequency so that one of the resulting pulse responses (h_f) of the frequency (f_{a1}) is constant positive in a first interval, is zero in a second interval and is constant negative in a third interval, and the resulting pulse response (h_ϕ) of the phase that is constant in at least a middle interval of the observation length and is otherwise zero, as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Mehrgardt (US 4634989) discloses a digital signal derived from an analog signal by means of an analog-to-digital converter clocked by a clock signal that is fed to a first delay element and a 90° phase shifter at the same time. The delayed digital signal is

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applied through a second delay element to one input of a first multiplier and directly to the other input of this multiplier; the signal at the output of the 90° phase shifter is applied directly to one input of a second multiplier and through a third delay element to the other input of this multiplier. The output signals of the multipliers are combined in an adder to provide the frequency and phase of the demodulated digital signal. Ohta (US 6614841) discloses a signal processing apparatus in which a received signal or a signal reproduced from a recording medium is subjected to both adaptive equalization and sampling. Ribner (US 5148167) discloses a sigma delta converter with frequency and phase calculation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
04-06-2005


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER



UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/928,402 | 08/14/2001 | Markus Freidhof | 4100-0130P | 7347 |
| 2292 | 7590 | 11/16/2004 | EXAMINER | |
| BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | TORRES, JUAN A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2631 | |

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

1st OA

| | | | |
|------------------------------|-----------------------------------|---------------------------------|--|
| Office Action Summary | Application No. <u>09/928,402</u> | Applicant(s) FREIDHOF ET AL. | |
| | Examiner Juan A. Torres | Art Unit 2631 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☒ Claim(s) 1-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>10272004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claims 1, 2, 8, 9, 10, 11 and 12 for a general value of B and for $B=3n$ must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will

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be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

~~The abstract of the disclosure is objected to because it contains 230 words.~~

Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities: the rational and the apparatus for the general case of B and the case of $B=3n$ (n is a positive integer) are not disclosed in the specification in such a way that will be possible to understand the method and apparatus to obtaining the frequency and phase of a digital signal by a person skill in the art.

Appropriate correction is required.

Claim Objections

Claims 5 and 6 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

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As per claim 5, claim 5 is dependent of claim 3 where the value of B is set to 3.

Claim 5 set the value of B=6 that doesn't further limit the scope of claim 3. The recitation "The method of claim 3" in claim 5 line 1 is suggested to be changed to "The method of claim 2".

OK

As per claim 6, claim 6 is dependent of claim 4 where the value of B is set to 3.

Claim 6 set the value of B=6 that doesn't further limit the scope of claim 4. The recitation "The method of claim 4" in claim 6 line 1 is suggested to be changed to "The method of claim 2".

OK

Claims 1-9 are objected to because of the following informalities:

As per claims 1 in line 12 the recitation "the differently-delayed" is vague and indefinite because there is insufficient antecedent basis for this limitation in the claim. It is suggested to be changed to "differently-delayed".

OK

As per claims 2-9 they are dependent of claim 1.

Claims 10-18 are objected to because of the following informalities:

As per claims 10 in line 13 the recitation "the differently-delayed" is vague and indefinite because there is insufficient antecedent basis for this limitation in the claim. It is suggested to be changed to "differently-delayed".

OK

As per claims 11-18 they are dependent of claim 10.

Claim 1 line 3 is objected to because the recitation "the input signal" is vague and indefinite because there is insufficient antecedent basis for this limitation in the claim. It is suggested to be changed to "the digital input signal".

OK

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Claim 2, lines 1-2 is objected to because the recitation "n is an integer" is inoperative. It is suggested to be changed to "n is an positive integer".

OK

Claim 10 line 4 is objected to because the recitation "the input signal" is vague and indefinite because there is insufficient antecedent basis for this limitation in the claim. It is suggested to be changed to "the digital input signal".

OK

Claim 10 line 5 is objected to because the recitation "a first filter (4)" is inoperative with the disclosure and the drawings. It is suggested to be changed to "a first filter (7)".

OK

Claim 12 line 1 is objected to because the recitation "the first filter (4)" is inoperative with the disclosure and the drawings. It is suggested to be changed to "the first filter (7)".

OK

Appropriate correction is required.

Allowable Subject Matter

Claims 1-18 are allowable over prior art (if the above objections are overcome).

The following is an examiner's statement of reasons for allowance: claim 1-18 are allowed because the references cited fail to teach, as applicant has, a method for estimating one of the frequency (f_{a1}) and the phase (ϕ_{a1}) of a digital input signal ($x(i)$) having the process steps of: determining phase values ($C_{a1}(i)$) of the input signal ($x(i)$), summing the phase values ($C_{a1}(i)$) over a predetermined summation length N/B which is a predetermined fraction $1/B$ of an observation length of N phase values ($C_{a1}(i)$), to create added-up phase values ($S_{a1}(i)$), reducing a sampling rate of the added-up phase values ($C_{a1}(i)$) by the factor N/B in comparison with a sampling rate (f_{a2}) of the phase

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values ($C_{a1}(i)$), delaying the added-up phase values ($S_{a1}(i)$) with at least $B-1$ delay elements, each of which delays the added-up phase values ($C_{a1}(i)$) by one sampling period of the reduced sampling rate ($f_{a2} \cdot B/N$), adding up the delayed added-up phase values ($S_{a1}(i)$) to create a resulting pulse response (h_f) of the frequency so that one of the resulting pulse responses (h_f) of the frequency (f_{a1}) is constant positive in a first interval (40), is zero in a second interval (41) and is constant negative in a third interval (42), and the resulting pulse response (h_ϕ) of the phase that is constant in at least a middle interval (43) of the observation length (N) and is otherwise zero, as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Mehrgardt (US 4634989) discloses a digital signal derived from an analog signal by means of an analog-to-digital converter clocked by a clock signal that is fed to a first delay element and a 90° phase shifter at the same time. The delayed digital signal is applied through a second delay element to one input of a first multiplier and directly to the other input of this multiplier; the signal at the output of the 90° phase shifter is applied directly to one input of a second multiplier and through a third delay element to the other input of this multiplier. The output signals of the multipliers are combined in an

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adder to provide the frequency and phase of the demodulated digital signal. Ohta (US 6614841) discloses a signal processing apparatus in which a received signal or a signal reproduced from a recording medium is subjected to both adaptive equalization and sampling. Ribner (US 5148167) discloses a sigma delta converter with frequency and phase calculation.

Conclusion

This application is in condition for allowance except for the following formal matters:

See objections above.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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JAT

11/9/2004

M. G.
MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER

AMENDMENTS TO THE DRAWINGS

Attached hereto are two (2) sheets of corrected formal drawings that comply with the provisions of 37 C.F.R. § 1.84 and are to replace sheets 2 and 3 of the drawings currently on record. The replacement drawings incorporate the following drawing changes:

To Figs. 6 and 7, the reference label "B=3" was added, and to Figs. 9 and 10, the reference label "B=6" was added.

It is respectfully requested that the corrected formal drawings be approved and made a part of the record of the above-identified application.

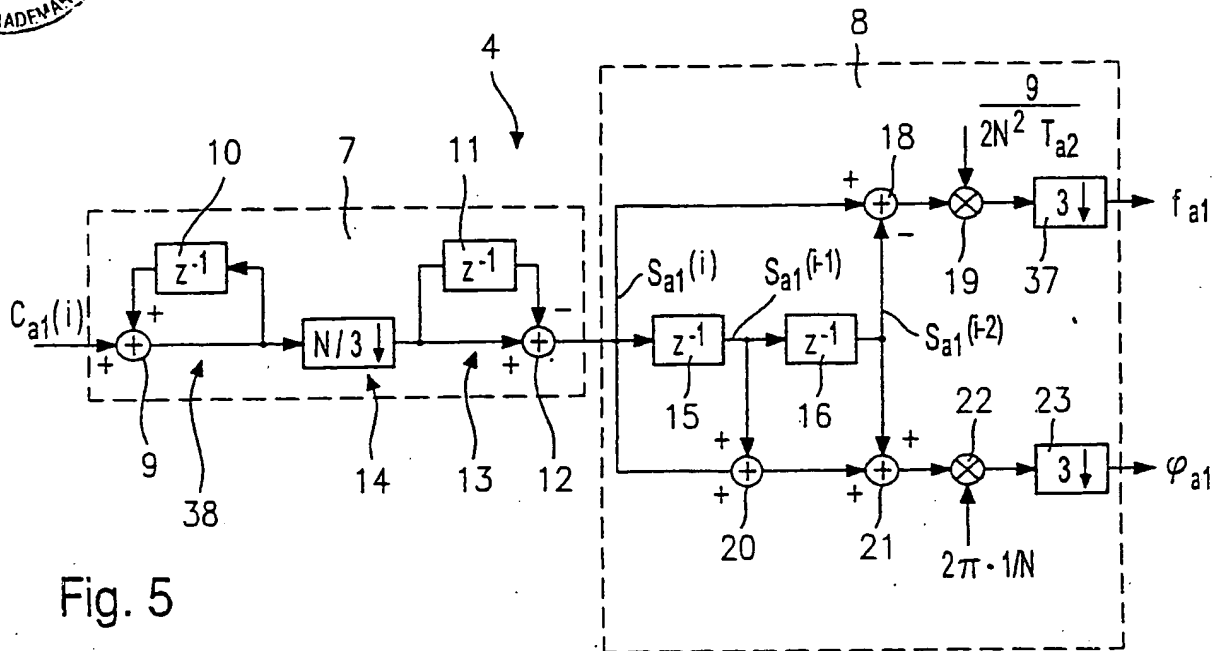


Fig. 5

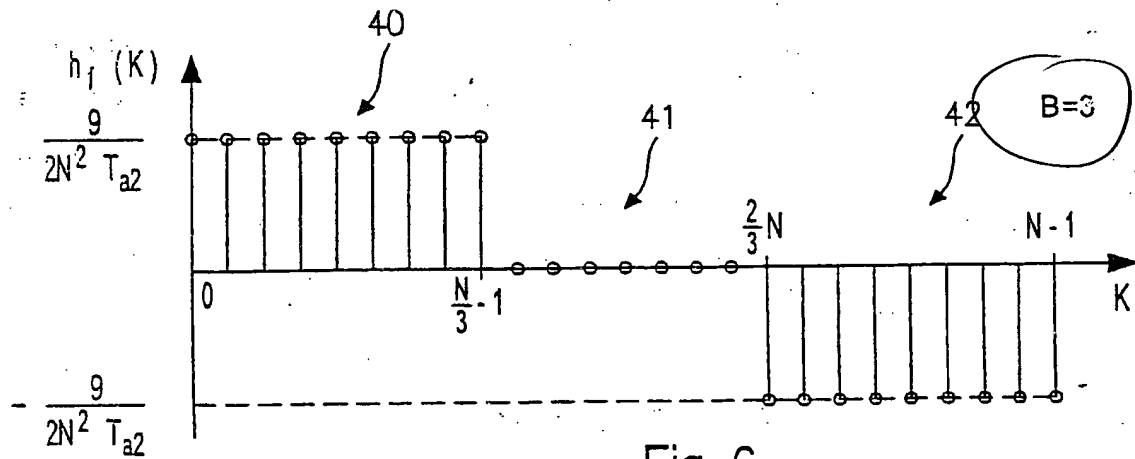


Fig. 6

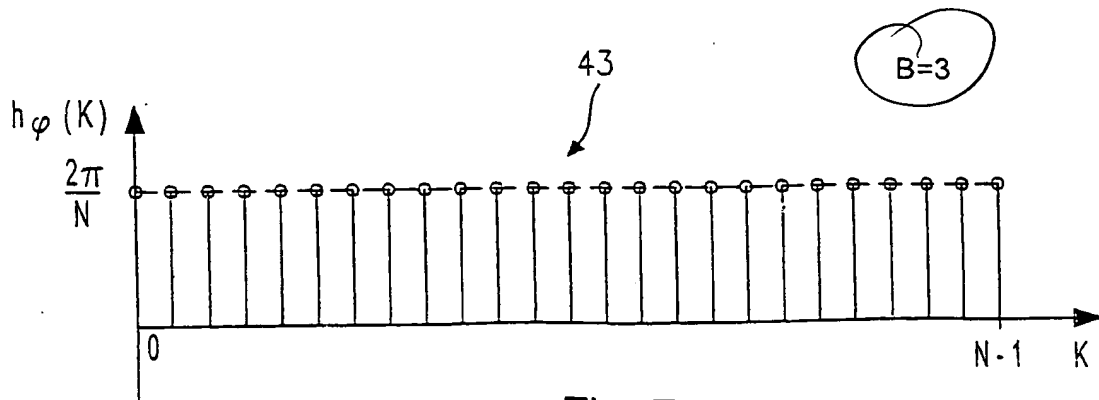
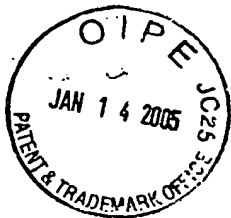
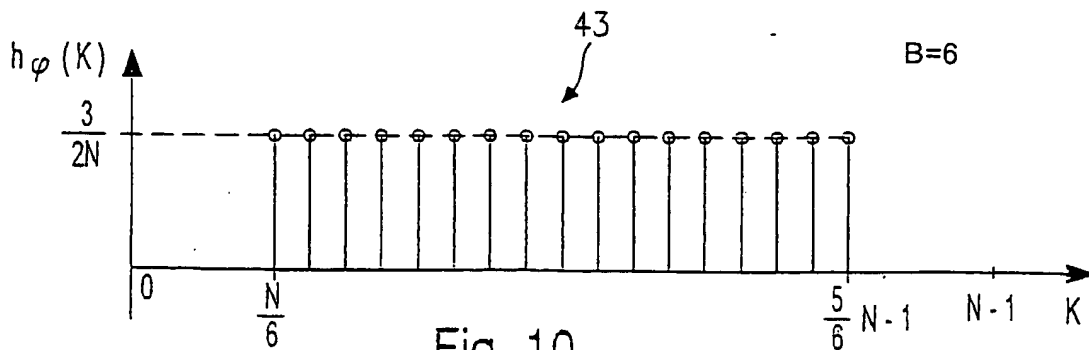
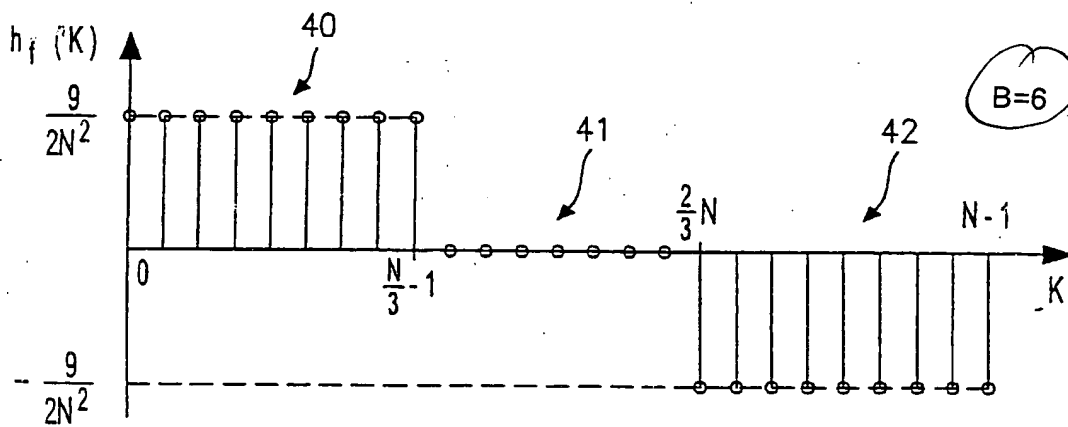
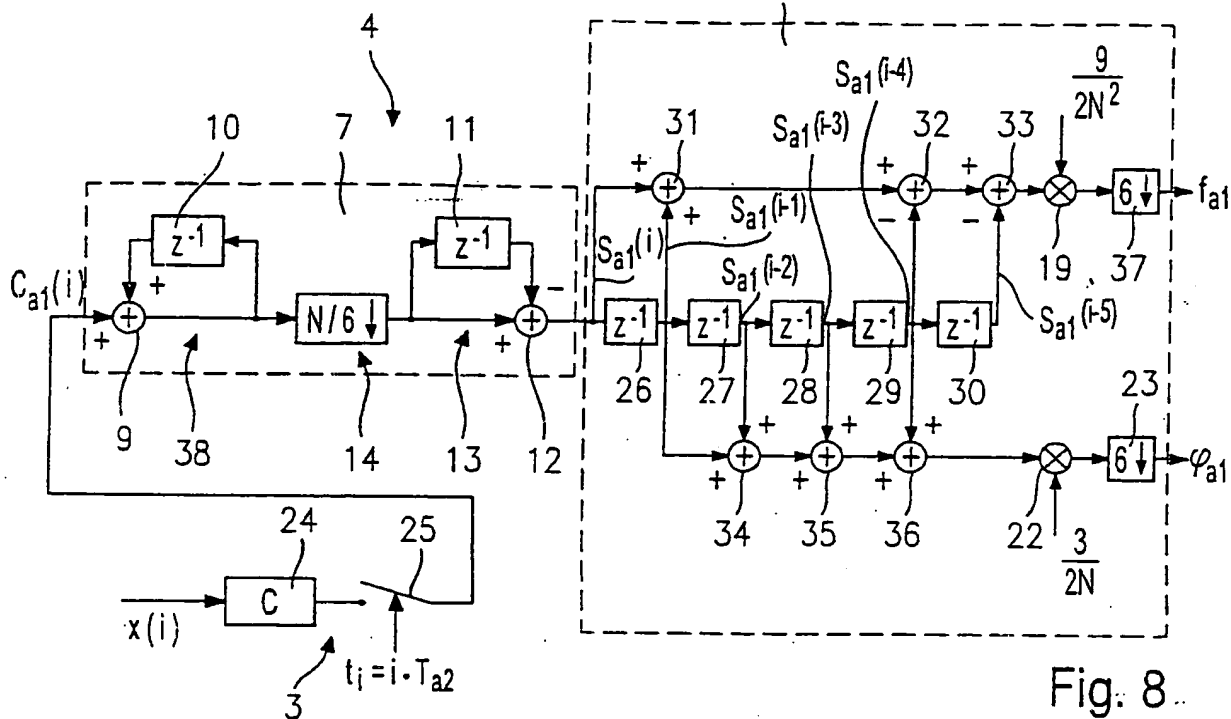


Fig. 7



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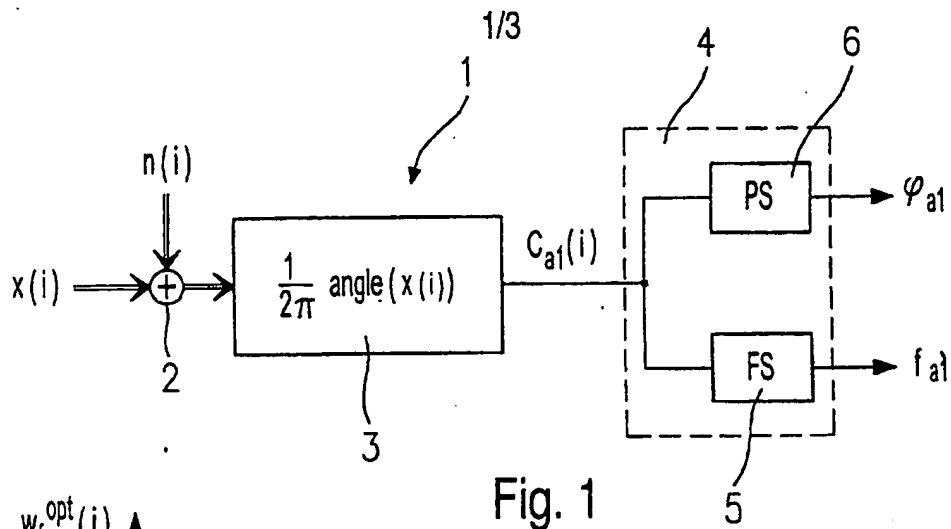


Fig. 1

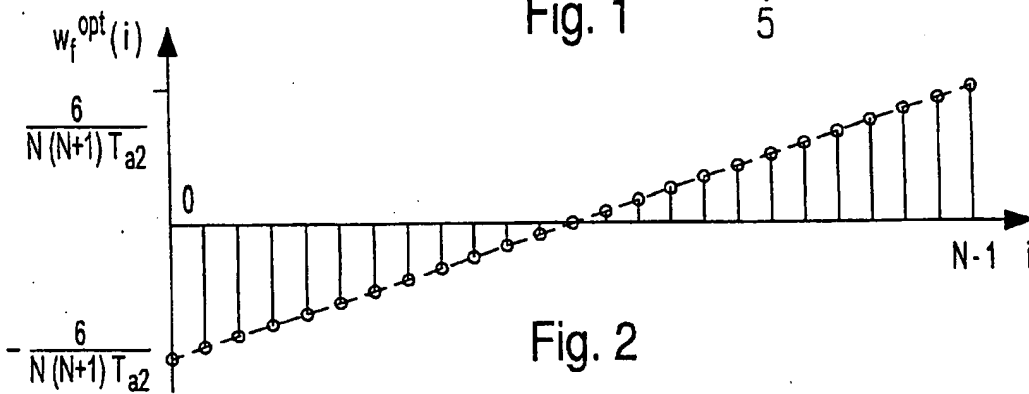


Fig. 2

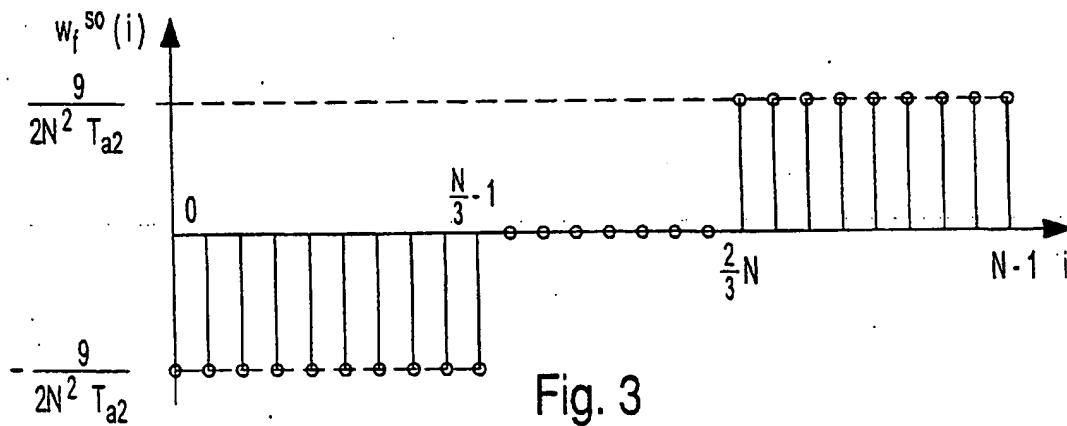


Fig. 3

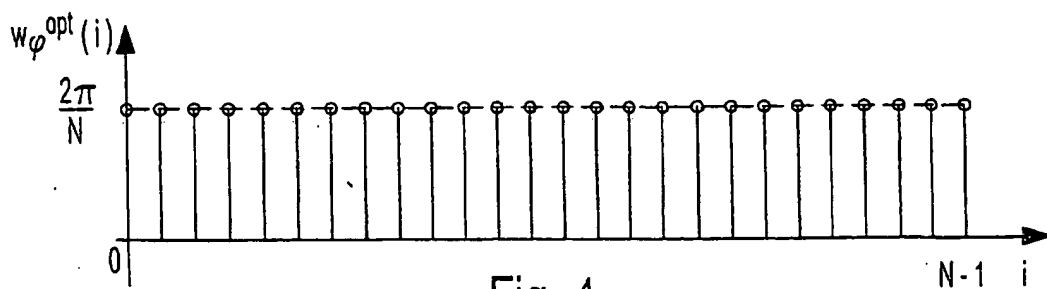


Fig. 4

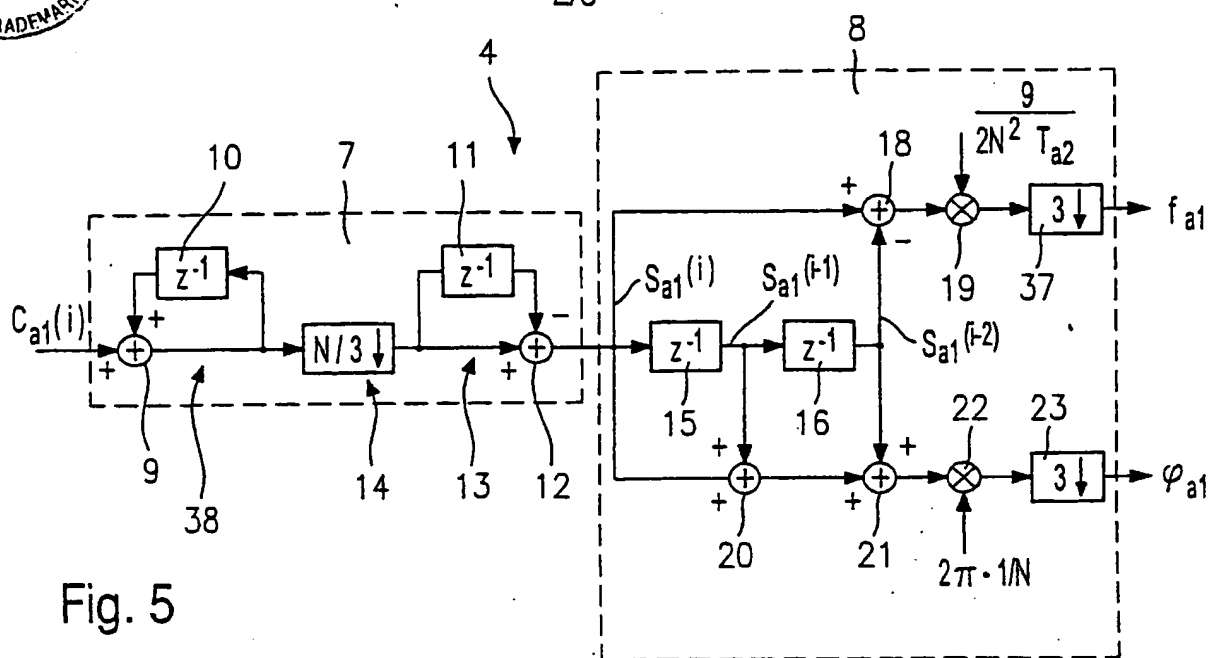


Fig. 5

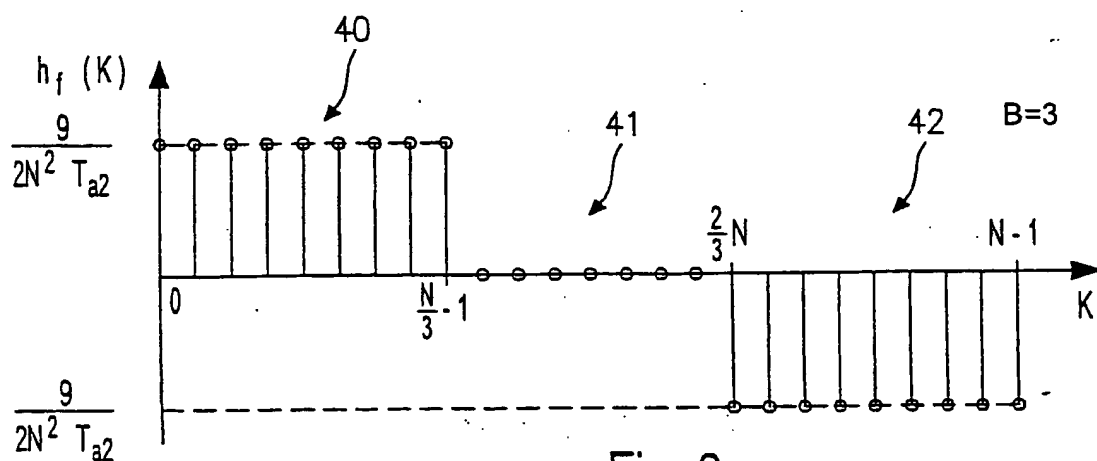


Fig. 6

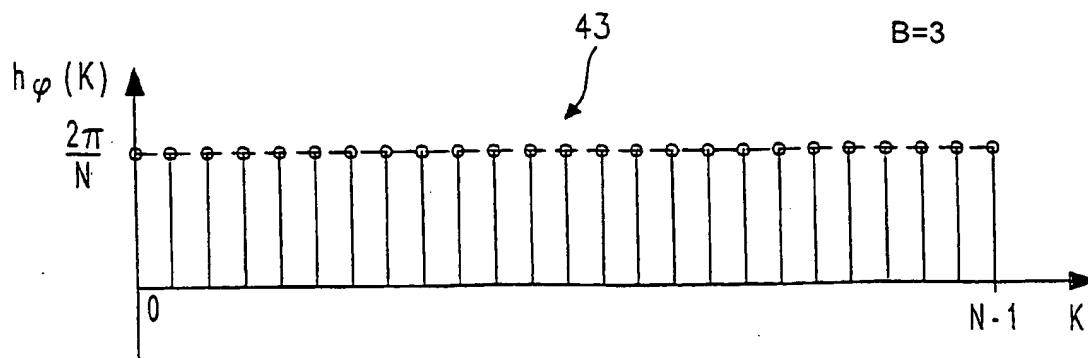


Fig. 7



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